

# The Lies of Unleaded Petrol

*Oil companies  
convinced us that  
unleaded petrol is  
safer for our health  
and environment  
than leaded petrol.*

*By their failure to  
disclose all the  
facts, we have  
been seriously  
conned!*

## *Part 1*

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**T**he very terms "leaded" and "unleaded" are misleading. They give the impression that "leaded" petrol is contaminated with something nasty, namely lead, while "unleaded" is somehow pristine, pure. Whilst it is true that "leaded" petrol contains lead, and lead is not a nice substance to have spewing out of the exhaust pipes of millions of cars, the truth is that unleaded petrol has even nastier properties. Let's start at the beginning.

When internal combustion engines were first developed for the automobile, they ran on a substance known as "motor spirit". By today's standards, motor spirit was an exceptionally "clean" fuel; properly burnt in an efficient engine, the main exhaust products were water vapour, carbon dioxide and some trace carbonic elements and particles. There were two main problems with motor spirit. First and foremost, it was a highly refined product which cost the oil companies far more to produce than what they wanted to spend, or what they thought they could charge if the automobile was really to take off in a big way. Secondly, the original combustion engines ran at very low compression ratios compared to today. As the vehicle manufacturers strove to produce ever faster, more powerful engines, they gradually raised the compression ratios, as this is one of the easiest ways of gaining more power from any given-sized power plant.

So, for a period, these two problems developed side by side until they eventually collided with the development of the V-8 engine. On the one hand, fuels were becoming less and less refined, and therefore more contaminated with products that adversely affected engine efficiency. On the other hand, power plants were being developed which employed ever higher compression ratios and required ever more exacting performance from the fuel used. With the advent of the high-compression engine, a point was reached where cars would not run satisfactorily on the product being supplied by the oil companies. An engine under load would develop a condition known as "pinging", where the fuel mixture would explode due to compression before the right time, causing rough running, stalling going up hills, and so on.

There was only a shortlist of answers. Vehicle manufacturers could go back to designing low-compression engines, the oil companies could go back to producing a highly refined product, or something would have to be found that could be added to stop the fuel pre-igniting. The first choice was unacceptable to the manufacturers. They had long since embarked on a marketing strategy that demanded ever bigger, ever more powerful power plants every year. Nobody was prepared to take the risk of producing a less-efficient, less powerful engine than the one offered the year before. The second choice was unacceptable to the oil companies. They had perfected the technique of producing a fuel with a minimum of refining, that could still be burned in engines, at such a low price and in such quantities that they were well on their way to becoming the richest, most powerful companies on Earth. They had no intention of greatly increasing the cost of their product, thereby turning many people off the "advantages" and "economy" of owning their very own car.

The third choice was the only acceptable one. All that was needed was to find some product, something that could be obtained cheaply, that could be added to petrol to reduce its tendency to "ping" under compression. Common lead was found to have all the right properties, and so "leaded" petrol was born.

By the late 'sixties, supplies of high-grade, low-sulphur, low-nitrate oil were becoming scarce enough to command premium prices. This type of oil was favoured by the petroleum producers, since removing these contaminants to an acceptable level is difficult and

costly. The companies were refining increasing amounts of the cheaper, high-sulphur, high-nitrate oil, but using the same old processes. This in turn led to ever higher levels of sulphur dioxide and nitrogen oxide in vehicle emissions, and people were starting to complain—if not about the environmental effect, then at least about the smell. The smog banks over the bigger American and Australian cities during this period were not, as most people believe, the result of so many more cars on the road, although this, of course, was a contributing factor. The main cause was the vastly increased levels of sulphur/nitrogen oxides in the vehicle emissions because of the higher levels of contamination in the fuels themselves. The oil companies were once again faced with the dilemma of cleaning up their product or finding another solution that did not affect their profits. The chemical theories and practices of catalytic conversion had been known for many years.

It had always been known to the oil companies that they could use these processes to further refine their petroleum products. This, however, would have meant major upgradings of their

refineries. Far better if they could get somebody else to foot the bill. Even better if they could get somebody to meet the cost of total responsibility for all the oxides.

In the 'fifties, a lot of work was done trying to utilise the CO<sub>2</sub> from such fixtures as coal and oil electric power stations to increase plant growth. These efforts failed because of the harmful effects of the concentrations of other pollutants in the exhausts. These were principally the same sulphur/nitrogen oxides. At the time of these experiments, it was discovered that passing the exhaust gases through a filter of platinum caused a catalytic conversion of the oxides to other products which could then be prevented from escaping into the greenhouses used for food production. The problem at the time was that it was not economically feasible to do this: platinum converters are very expensive things, and they do eventually wear out and require replacing. There was an added problem that the eventual by-products were in many cases even more harmful than the original oxides. This information then remained unused for some decades.

## LIES, DAMNED LIES AND STATISTICS

"It's a trick," said Barry Carbon, Director of the Commonwealth Environment Protection Agency.

He was looking at the table of US figures on blood-lead levels and lead in gasoline (Table 1) which was used at last July's Lead Roundtable, chaired by then-Environment Minister Ros Kelly and attended by her state counterparts and industry representatives.

He called it a trick when he was shown, for the first time, another table which showed the long-term relationship between US blood-lead levels and lead in gasoline (Table 2).

Table 1 shows what appears as a clear link between lead in petrol and blood.

Table 2 was not presented to the meeting. It is the full story from which the 1976-80 section was lifted to produce Table 1. The full story shows that lead in blood has declined continually, unaffected by a marked rise and fall of lead in petrol.

Professor Roger Perry, Professor of Environmental Control and Waste Management at London's Imperial College of Science, Technology and Medicine, says, "The whole issue of lead in petrol has been misrepresented by scientists and by the Press."

"The rise and fall of lead levels in blood is related to a whole range of phenomena—lead in paint, in water, in dust, in solder, food canning, and the like—and it is very easy politically to ignore these major sources.

"If you look at the graph relating to blood leads, it has no correlation whatsoever with the changing levels of lead in

petrol. It is food industry and water supply."

One source of lead in children's diets has been the solder of baby food tins and other canned goods. One industry estimate is that the amount of lead in Australian baby-food cans has declined to about 20 per cent of what it was 15 years ago. Such sources of orally ingested lead are recognised as being of much greater significance than airborne lead. Recent Australian research bears this out and shows that airborne lead is very unlikely to cause an Australian child's blood-lead levels to exceed safety levels adopted by the National Health and Medical Research Council.

None of these high lead levels was linked to airborne lead.

(Source: Simon Grose, *The Canberra Times*, 26 March 1994)

### GASOLINE LEAD vs. BLOOD LEAD FOR USA

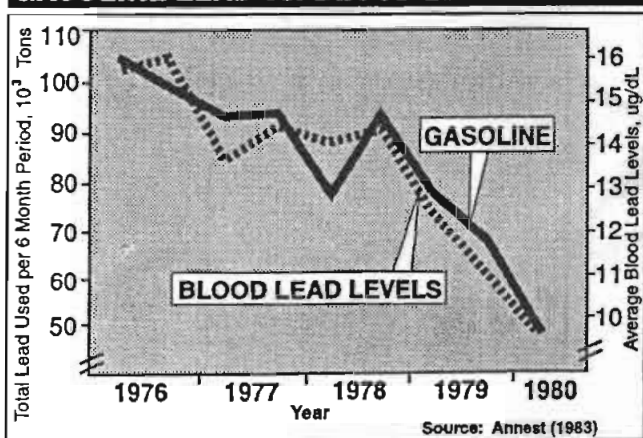


Table 1: This table appears to show a strong correlation between blood-lead levels and lead content of fuel in the US.

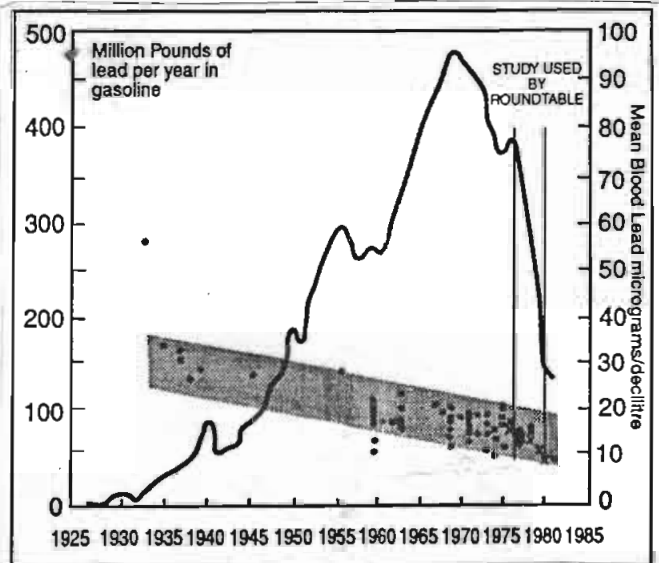


Table 2: The dots in the shading cover about 76 studies of blood-lead levels. The 1976-80 section was used to produce Table 1.

## THE BIG CON

Eventually the blankets of sulphur and nitrogen oxides, better known as smog, grew so thick and so unbearable that "public opinion" caused America's legislators to start looking for answers. Obviously the place to start was with the oil companies. The oil companies announced quite loudly, and mostly erroneously, that the problem was "so many cars".

There were only two solutions, they said: either limit the number of cars, or put something into the cars to "change" and limit the emissions. Was such a thing possible, asked the legislators? Certainly, replied the oil companies. Let us tell you about "catalytic converters" which can be fitted to the exhaust system of every car.

The legislators, although they toyed with the concept, were not about to try and seriously interfere with people's rights to drive motor cars. Such action was perceived as electoral suicide, especially when there was the alternative "magic bullet" solution of converters available. Neither were they about to listen to all the "extremists" who were trying to tell them that the problem was in the type of oil being refined in the first place, and the only long-term solution was to get the oil companies to clean up their act. Such people contribute very little to election campaigns; the petrol chemical giants contribute millions. There was only one problem left for the oil companies. Unfortunately, while platinum doesn't react to any great degree with the products of burnt petrol, it reacts very readily with lead—so readily, in fact, that burning a single tankful of "leaded" petrol in a car with a catalytic converter will render the converter useless. (This is the reason it is illegal to put "leaded" petrol in the fuel tank of a car designed to run on the "unleaded" variety.)

Trouble was, the oil companies couldn't simply stop putting lead in petrol, because the original reason for its presence—to stop

"pinging"—still existed. There were available alternative additives that could be used, but these all had the disadvantage that, untreated, they produced emissions far more deadly than even the lead. On the plus side, however, these emissions could be filtered out by catalytic converters. What was needed, then, was a campaign to convince people that "leaded" petrol was a grave danger to the environment, and that the only solution was to cease using it, replace it with the "unleaded" variety, and then run the emissions through a catalytic converter. Such a campaign would ensure that legislation was passed forcing the fitting of catalytic converters, which would overcome the original problem for the oil companies—the increased levels of sulphur and nitrates in their fuel. You see, the campaign never had anything to do with lead: it was simply a matter of convincing people to use a fuel that wouldn't wreck the converters, so that the petroleum companies didn't have to spend any more money refining the oil and could get away with selling a dirtier product, forcing the motorist to bear both the responsibility and the cost of trying to clean up the air.

Anybody who doubts it was the quality of the petrol rather than the number of cars which caused the massive increase in smog in the period in question, need only look to actual figures. While it is true that the number of cars in use was increasing, the rate of increase was fairly steady. At the height of the "smog wars", however, the levels of emissions were increasing at nearly four times the rate of growth of car ownership. On top of that, this was the period where petrol was starting to get more expensive, and "economical" engines were becoming the order of the day. That is, although both car ownership and petrol consumption were on the increase, rate of ownership far outstripped rate of increase of consumption.

(Source: Peter Sawyer, *Green Hoax Effect*, Groupacumen Publishing, Wodonga, Victoria, Australia, 1990)

## — HEALTH RISKS FROM ULP! —

**A**s you are aware, we have been told that our old cars must go because of their 'dirty' exhausts, in particular the lead issuing forth and causing great public health problems.

Dr David Warren was the guest speaker at the quarterly meeting of the AOMC (Vic) on 28 February 1994. Dr Warren is a retired Research Scientist for the Department of Defence and was the Energy Resources adviser to the Victorian Government back in the early/mid-'80s when the ULP debate was gathering momentum. Here is a condensed summary of Dr Warren's address.

### ENTER LEAD

"In the early 1920s, a fellow called Thomas Midgie was looking for something to combine with the free radicals to stop 'knocking'. He found that things like platinum, silver and lead were able to hold these free radicals. Midgie figured that if he could get lead oxide spread through the mixture, sooner or later the free radicals

would bump into a bit of lead oxide, which forms lead dioxide, as lead has four bonds, but that breaks down to lead, Pb<sub>2</sub>, and oxygen, O<sub>2</sub>, but slowed down the reaction.

"In searching for a way to get the lead spread through the mixture, Midgie found a compound called lead tetraethyl which is similar to the combinations in the groups making up petrol. The first good thing about it is because it is like petrol, it is soluble in petrol. The second is that it vaporises like petrol, which means that the lead tetraethyl is dotted around in the mixture. The third thing: it breaks down to lead at upper cylinder temperatures, lead atoms spread around and the ethyls are let go. Then the lead does its job, combining with the free radicals and slowing down the reaction.

"Midgie's research took the octane number from 50 to 65; then research at the refinery introduced crackling reforming and improved the octane number past 89; then, with further developments and money, they got the octane number up to 110 for aviation fuel.

### ENTER THE GREENIES

"Clean up car exhausts' was the cry. By 1975, lead was being reduced in petrol because lead is a poison—that is a general statement; however, to get the fact exact you should say lead is a poison when it is absorbed into the body.

"Now, the fact that lead is a poison if absorbed, does it follow that the lead in our bodies is from the lead in petrol? That was the debate in the early '80s. There were a large number of contradictory reports in the papers, and the National Energy Advisory Committee reported 'no single case of clinical lead poisoning has ever been demonstrated to be due to automotive emissions of airborne lead'.

"There were tests and arguments all over the world. In Frankfurt, the government decided they would cut the lead in petrol from 0.4 to 0.15 grams per litre, about two thirds. Now if the lead was a problem, it should have an effect on the community. If petrol is causing part of the lead in the community and you cut it by two thirds, any scientist knows it must have an effect,

## — HEALTH RISKS FROM ULP! —

otherwise it had nothing to do with it.

"The nett result: 'Since the changes observed are only of the order of statistical scatter (that is, you would never measure anything and get the same thing twice), this indicates that lead from petrol did not contribute to uptake by ingestion through significant deposition on food and utensils as has been suggested. If it had done, greater and continuing decrease in blood levels in the community should have been observed.'

"In other words, they measured nearly a thousand people over a five-year period and there was no change at all despite cutting the lead content in petrol.

"In London we had Professor Lowthur of the University of London pointing out that the lead that comes out of the exhaust has been baked at 2,000-3,000° Centigrade, like a house brick, but so small that you need a microscope to see it. It doesn't get absorbed through the lungs and doesn't even dissolve in the diluted hydrochloric acid of the stomach.

"It appears that the lead in the air is not the source of the lead that is observed in the community.

"Besides, you can measure the lead coming out of the cars and it settles. You measure it as grams per cubic metre at the edge of the road, but if you go back ten feet it is less because it's very heavy dust. Even though it's very small particles it is very heavy."

### ENTER THE POLITICIANS

(In 1983 Dr Warren was the scientific adviser to the committee for Energy Resources.)

"The question came up: 'Will we ban lead in petrol?' The real question was will we have ULP?' The real reason for ULP was that people wanted to fit catalytic converters on their cars to get rid of the nitric oxides, carbon monoxide and unburnt petrol that came out, but the lead spoilt the catalytic converters. That was the reason that the rest of the world gave up lead in petrol. The other countries banned it to bring in converters; we banned it because we think it's dangerous.

"So I (Dr Warren) prepared a speech and convinced the Committee—about a dozen people from both parties—that lead didn't need to be banned and that we didn't need lead-free petrol because the evidence wasn't there.

"I prepared a subsequent speech presented to Parliament by the then-State Member

for Ballarat. At the same time there was a paper from Dr Bell, the Director of Health of the New South Wales Government.

"Dr Bell asked what was going to be added to the petrol to raise the octane number if the lead was removed: 'If the lead is taken out, you have to add other things to run them in our cars; we put in benzene, toluene, xylene, dimethylbenzene or mesitylene. They're all ring compounds and the dangers are that some of them are declared carcinogens and the others are suspected carcinogens. We're going to cut lead even though there is no proof that it

**"In fact, this stuff appears to be so dangerous, potentially lethal, that I urge you not to use it in any car not fitted with a catalytic converter.**

**Don't use it in your mower, chainsaw, whipper-snipper or outboard motor, and don't wash parts in it. If any gets on your skin, wash it off immediately.**

**Avoid the fumes when refuelling and don't allow anyone near the exhaust, particularly when the exhaust system is cold."**

does anything wrong, and we're introducing substances which will ultimately be affecting the cancer rates in our country.'

"The answer was: 'We have converters and they will destroy them', but we all know that converters don't work until they are hot—about the first three miles or so—and every time you fill up, the vapours are coming off.

"Now when the speech was delivered to Parliament, there were only two people listening: myself (Dr Warren), to see that he got it right, and the Member giving the speech. It seems that the prevailing attitude was: 'Don't confuse us with the facts; our mind is made up, the people want it and that is where the votes are.'

"Nobody listened to that speech because it was party policy: both parties said, 'No, we've decided—it doesn't matter what the man says; go and have a drink at the bar and when the bell rings we'll come in and vote'—and that's how it was decided!"

### ULP HEALTH RISK

Even at that stage, Dr Warren had found that the lead problem was highly overstated and that the potential hazards from the aromatic octane enhancers—like benzene—were greater than the perceived lead problem.

"In fact, this stuff appears to be so dangerous, potentially lethal, that I urge you not to use it in any car not fitted with a catalytic converter. Don't use it in your mower, chainsaw, whipper-snipper or outboard motor, and don't wash parts in it. If any gets on your skin, wash it off immediately. Avoid the fumes when refuelling and don't allow anyone near the exhaust, particularly when the exhaust system is cold. Remember that catalytic converters don't work until they reach some 400°C."

In Britain, this risk is so clear that the National Society for Clean Air has removed their support for ULP!

Dr Warren's research showed that the lead in blood comes not from breathing airborne lead but from eating and drinking it—that is, principally from soldered food containers, lead-based paints and lead pipes.

In fact research showed that the blood lead levels were higher in country people drinking bore water, such as the New Guinea highlanders and peoples on remote islands, without motor vehicles than in blood samples taken from those living in the heart of Melbourne.

### ALTERNATIVE

You will recall in the past I have referred to a device invented by Mr A. Bodycomb. This device would do essentially the same job as a catalytic converter, that is, remove carbon dioxide and unburnt fuel from car exhausts, but it would also remove lead—so there would be no need for ULP!

This device was tested in the early '70s, but those testing it seemed conveniently to forget the test results later, favouring instead the dry converter that we now have.

Mr Bodycomb lives in Melbourne and even now cannot get anyone interested enough to have a look at it.

(Source: Extracted from an article by Graham Allum, published in *Restored Cars Magazine* #104)

**Part 2 of this series will explore in more detail the health dangers of unleaded petrol and catalytic converters.**